PB89-225569

Superfund Record of Decision (EPA Region 9) Ordot Landfill, GU. (First Remedial Action), September 1988

(U.S.) Environmental Protection Agency, Washington, DC

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Office of
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September 1988

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EPA

Superfund Record of Decision:

Ordot Landfill, GU

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16. Abstract (Limit: 200 words)

The Ordot Landfill site is located on the Island of Guam. The landfill is in a volcanic upland region, where site runoff flows directly into the adjacent Lonfit River. Water wells have not been drilled in the volcanics near the landfill. There is concern, however, that a suspected fault near the landfill may provide a hydrologic connection between the contaminants at Ordot Landfill and Guam's major drinking water acquifer located in the northern limestone province of Guam. The landfill is presently managed and operated by the Guam Department of Public Works, and has been receiving uncontrolled municipal wastes since before World War II. Because it is the only major public waste disposal site on Guam it has received some hazardous waste during its history, including spent industrial and commercial chemicals, PCB-contaminated oils from transformers, and perhaps munitions. The facility uses almost the entire 47-acre waste disposal area, with only approximately 4 to 7 acres of the oldest portion of the landfill not currently in use. The current depth of disposed wastes is approximately 100 feet. In March 1986, EPA found Ordot Landfill in violation of the Clean Water Act for discharging landfill leachate to the Lonfit River without an NPDES permit. The 1987 initial site characterization study concluded that surface flow through the landfill is the source of leachate, the site is hydrologically isolated from the island's sole
(See Attached Sheet)

17. Document Analysis a. Descriptors

Record of Decision
Ordot Landfill, GU
First Remedial Action - Final
Contaminated Media: gw, sw
Key Contaminants: iron, manganese

b. Identifiers/Open-Ended Terms

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Ordot Landfill, GU
First Remedial Action - Final

16. ABSTRACT (continued)

source aquifer, there is an absence of organic contaminants, inorganic contamination is below the appropriate MCLs, and no air quality problems exist. The study concluded that current threats to human health and the environment are a result of poor landfill operation practices and not a result of the few acres of the landfill which are no longer in operation. The primary contaminants of concern affecting the ground water and surface water include iron and manganese.

The selected remedial action for this site is the no action alternative. EPA concludes that threats to human health and the environment can best be mitigated through addressing operation and maintenance of the landfill, and that the appropriate mechanism for implementing these controls is through enforcement of the Clean Water Act. Further, EPA concludes that any remedial action to address the inactive portion of the landfill would be jeopardized or nullified unless operation practices at the active disposal areas are improved. No costs are associated with the no action alternative.

FINAL
RECORD OF DECISION
ORDOT LANDFILL
SUPERFUND SITE
GUAM

SEPTEMBER 1988

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 9

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DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Ordot Landfill, Guam

STATEMENT OF PURPOSE AND BASIS

This decision document represents the decision to take no action under CERCLA but to defer clean-up of site threats to the Clean Water Act as a more appropriate authority for the Ordot Landfill in Guam. The decision was developed in accordance with CERCLA as amended by SARA, and to the extent practicable, the National Contingency Plan. This decision is based on the administrative record for this site. The attached index identifies the items which comprise the administrative record.

DESCRIPTION OF THE SELECTED REMEDY

EPA has determined, based on the available information, that remedial action at the Ordot Landfill site under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund) 42 U.S.C. Section 9601 et seq. is inappropriate at this time.

This determination is based on several facts: 1) Ordot Landfill is an operating municipal landfill; 2) all but approximately 4-7 acres of the 47 acre site are active waste disposal areas; 3) the 4-7 inactive acres are downgradient of the active waste disposal areas or are immediately adjacent to active waste disposal areas; 4) any remedy for the inactive areas will likely be affected by activities at the active waste disposal areas or continued surface flows through the landfill; 5) the bulk of any environmental impacts from the landfill will result from activities at the active waste disposal area; 6) the landfill, by applying standard operation practices to control landfill leachate, can effectively reduce or eliminate the surface flow of leachate to receiving waters; 7) EPA has issued an order under the Clean Water Act, 33 U.S.C. Section 1251 et seq., that requires the Guam Department of Public Works to cease discharge of leachate from Ordot Landfill to the Lonfit River; and 8) EPA data, although too limited for comprehensive conclusions, has not demonstrated any imminent and substantial endangerment to human health or welfare or the environment.

EPA concludes that threats to human health and the environment currently identified at the landfill are due to poor operation practices and can best be mitigated through addressing operations and maintenance of the landfill itself including improved leachate

control measures consisting of capping and surface water control. EPA concludes that the appropriate mechanism for implementing these controls is through enforcement of the Clean Water Act. The responsibility for implementing these controls lies with the landfill operator, the Territory of Guam. Expenditures from the Superfund for these purposes are not appropriate.

Further, EPA concludes that any remedial action to address the inactive portion of the landfill potentially appropriate for response under CERCLA would be jeopardized or nullified unless operation practices at the active disposal areas are improved to reduce leachate formation and to prevent discharge of leachate. The design for improved operations at the active disposal areas must consider the inactive portion due to the nature of the site and thus would make a separate CERCLA remedial action unnecessary.

Based on these considerations, EPA selects no action as the preferred alternative under CERCLA. As part of the preferred alternative, EPA will continue to gather additional data to identify any adverse impacts on human health or welfare or the environment attributable to the landfill not currently identified and remediated by the improved landfill operation practices. As part of this continued monitoring program at Ordot Landfill, EPA will monitor to detect as early as possible any migration of contaminants from the landfill toward the sole source aquifer. The design of this program will be based upon further hydrogeological investigations at the site and in the vicinity of the site to characterize geologic and hydrologic features necessary to define the monitoring program.

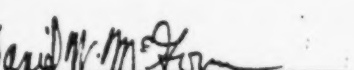
In choosing the no action alternative EPA reserves its authority to perform additional response actions should the new information warrant such a decision.

DECLARATION

This decision document represents the selected alternative for this site developed in accordance with CERCLA, as amended by SARA, and the National Contingency Plan.

The Territory of Guam has concurred on the selected remedy.

9.28.88
Date



Daniel W. McGovern
Regional Administrator

Record of Decision
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DECISION SUMMARY

ORDOT LANDFILL, GUAM

I. SITE LOCATION AND DESCRIPTION

Ordot Landfill (Ordot) is an operating municipal landfill located on the island of Guam (Figure 1-1), and is the only major municipal landfill on the island. It is currently operated by the government of Guam through the Department of Public Works. The site has been receiving uncontrolled municipal (and perhaps hazardous) wastes since before World War II.

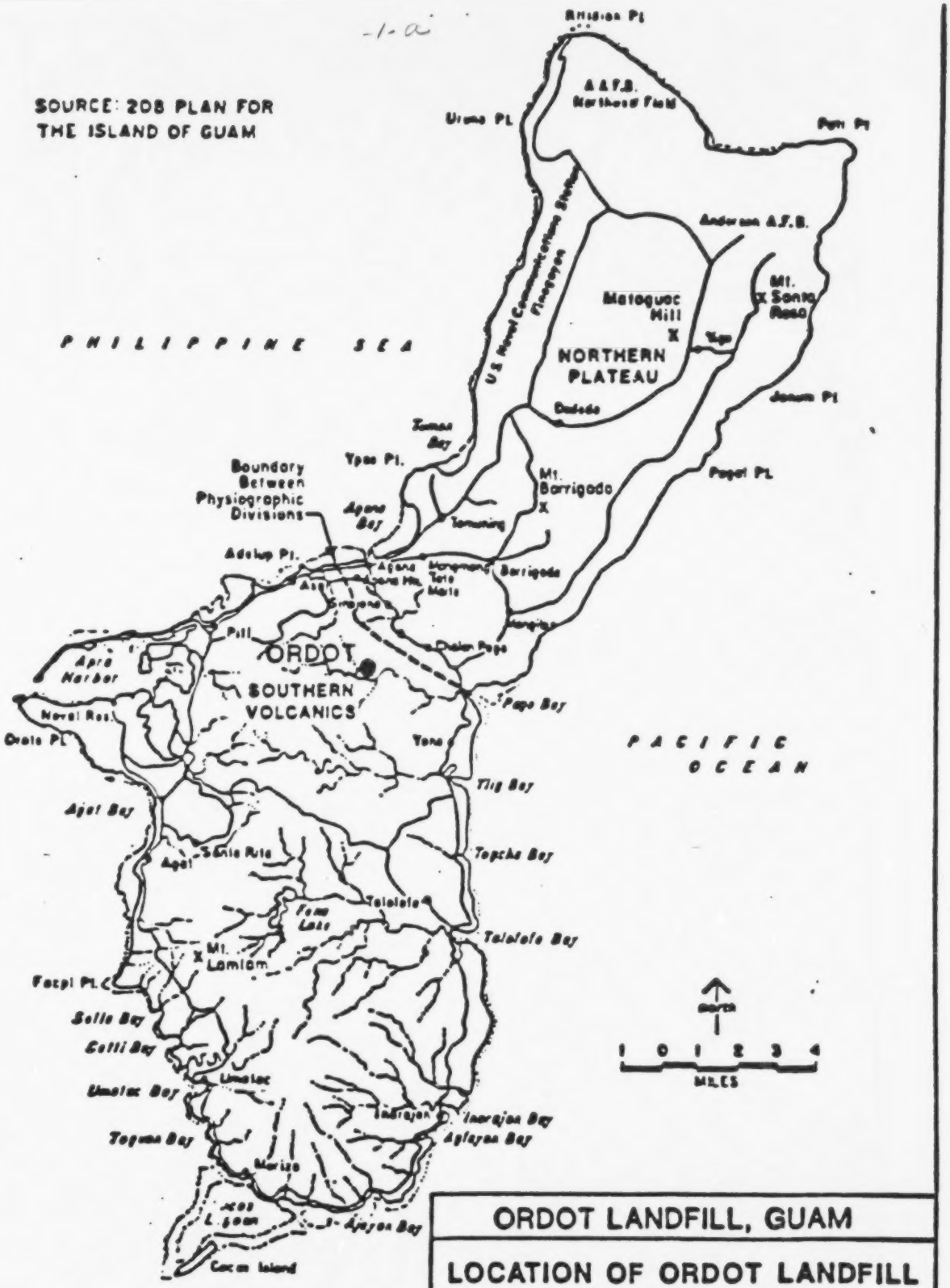
The Japanese and United States military occupational forces used the landfill during World War II, but the nature of the waste placed in the landfill at that time is unknown. After World War II and with the expansion of the highway system in the more populated areas of northern Guam, Ordot Landfill became the primary repository of municipal waste for the island and is used by both the civilian population and the United States military. The landfill is presently managed and operated by the Guam Department of Public Works. Although Ordot Landfill primarily received municipal waste, because it is the only major public waste disposal site on Guam, the Guam Environmental Protection Agency (Guam EPA) feels that it has received hazardous waste during its history, including spent industrial and commerical chemicals, PCB contaminated oils from transformers, and perhaps munitions. Unfortunately, records have never been kept as to the nature and quantity of hazardous wastes disposed of at Ordot Landfill.

Ordot Landfill is located in the volcanic upland near the divide between the southern volcanic and northern limestone geologic provinces which comprise the island of Guam (Figure 1-2). The primary concern is that a suspected fault near the landfill may provide a hydrologic connection between the contaminants at Ordot Landfill and Guam's major drinking water aquifer located in the limestone province. A second basis of concern regards leachate runoff impacts on the adjacent Lonfit River, which flows into Pago River, and ultimately Pago Bay. The source of leachate flow was suspected to be a perennial stream fed by a spring buried beneath the landfill and originating in the fault.

II. SITE HISTORY

Ordot Landfill is an operating facility and has been in continuous operation for approximately 40 years. It continues to

-1-a



ORDOT LANDFILL, GUAM	
LOCATION OF ORDOT LANDFILL -ISLAND OF GUAM	
CAMP DRESSER & McKEE INC.	Fig. 1-1

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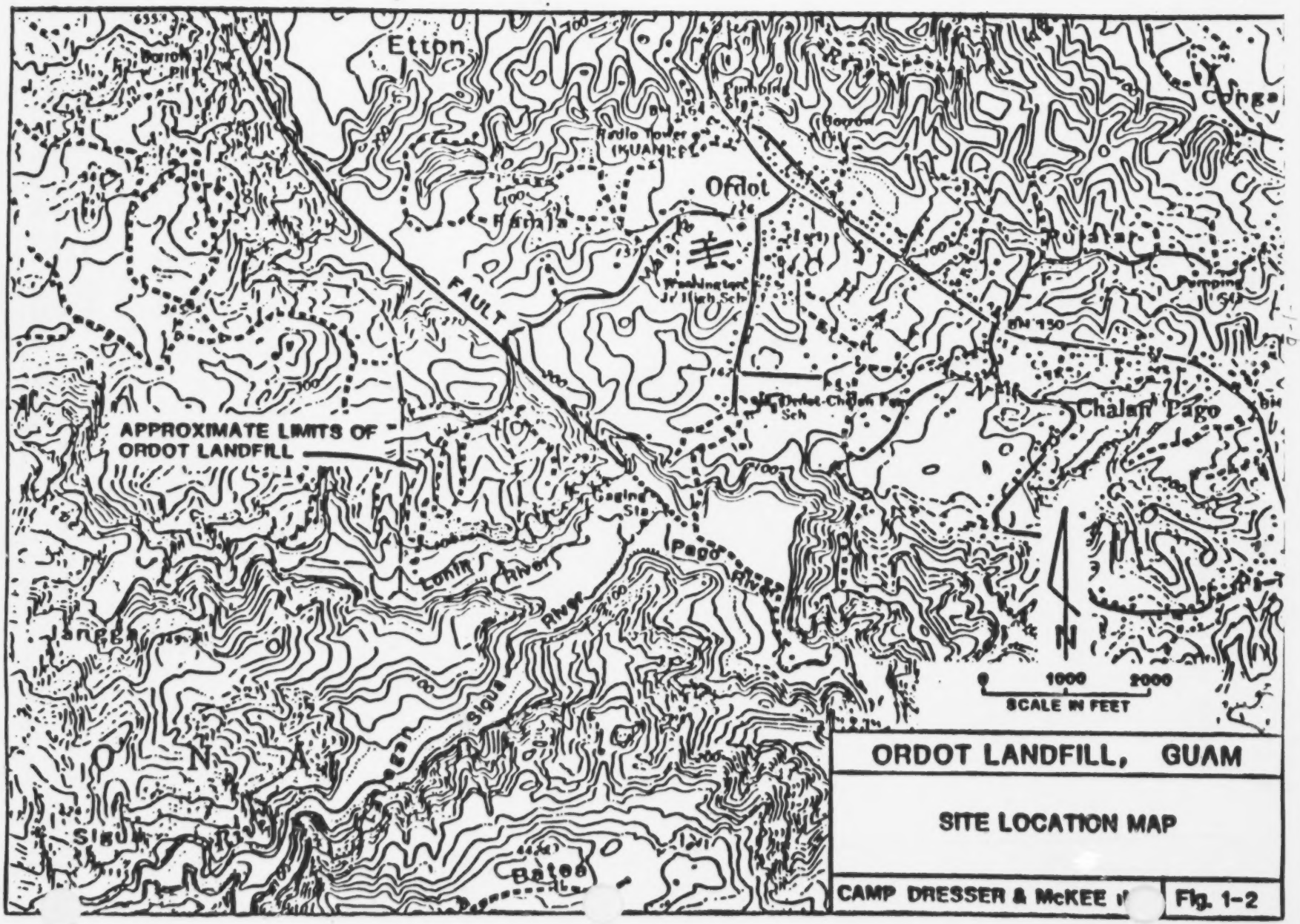

ORDOT LANDFILL, GUAM

SITE LOCATION MAP

CAMP DRESSER & McKEE

Fig. 1-2

be operated more as an open dump than as an engineered landfill. Ordot Landfill was established in a ravine which slopes steeply to the Lonfit River. Current operations at the facility utilize almost the entire historic 47 acre waste disposal area with only approximately 4-7 acres of the oldest portion of the landfill not currently in use. The unused portions of the historic waste disposal area are downgradient or adjacent to current operations. One inactive area forms the steeply sloping toe of the landfill. The current depth of disposed wastes is approximately 100 feet. The toe of the landfill is approximately 1000 feet from the Lonfit River and leachate streams emanate from points along the contact of the landfill toe and the clay soils which comprise the banks of the Lonfit River.

The Governor of Guam designated Ordot as Guam's highest priority site for Superfund clean-up. It was included on the initial National Priorities List (NPL) which was finalized on September 8, 1983.

On March 26, 1986, EPA found Ordot Landfill in violation of the Clean Water Act for discharging landfill leachate to the Lonfit River without a National Pollutant Discharge Elimination System (NPDES) permit. EPA ordered Ordot Landfill to cease discharge. Ordot Landfill remains in violation of the EPA order.

III. ENFORCEMENT ACTIVITIES

A potentially responsible party (PRP) search has been performed to identify responsibility for the contamination at Ordot Landfill. The PRP search included a title search of the Ordot Landfill, a trip to Guam to interview individuals and agencies that have or may have interfaced with the landfill and its operations, file reviews of federal and Guam government agencies, contacts with consultants and other firms that may be knowledgeable of Ordot Landfill or activities related to it, and a field survey of the site to review operating practices.

The field survey was also performed to identify and locate industrial properties surrounding the landfill that may have contributed to the local groundwater contamination. During the field survey, visual evidence of any type of industrial operation or storage facility was used as the criterion to identify PRPs. The result of the field survey found no industries or other suspected practices in the vicinity of the landfill.

Results of the PRP search indicate that several PRPs can possibly be identified based upon the information obtained: U.S. Navy, Government of Guam, and the Department of Public Works. Other agencies or businesses that are known to have disposed of

waste in the landfill include the Agana Sewage Treatment Plant.

Guam EPA reported that private disposal companies and local hospitals have also disposed of waste at Ordot. Those cited were Guam Memorial Hospital and Commercial Sanitation Systems, Inc, but others may be active on the island.

IV. COMMUNITY RELATIONS

Community involvement was solicited at the conclusion of EPA's Phase I Remedial Investigation. The notice of availability of the Proposed Remedial Action Plan with supporting documentation, which identified EPA's and Guam EPA's preferred remedial alternative of no action for this site, was published on June 27, 1988. The Proposed Remedial Action Plan and supporting documentation was released to the information repositories on July 12, 1988. The public comment period, initiated on this date, solicited public comment through August 12, 1988. A public meeting was held July 26, 1988.

EPA prepared the attached Responsiveness Summary to address the specific concerns raised during the public comment period, including comments made at the public meeting. A transcript of the public meeting is available at the information repositories at EPA, Region 9 offices, and Guam EPA.

V. REMEDIAL INVESTIGATION

A. INITIAL SITE CHARACTERIZATION (ISC)

An initial hazardous waste characterization study performed by Black and Veatch Engineers -- Architects (1983) was inconclusive with regard to documenting the nature and extent of the threat actually posed by contaminants from Ordot Landfill. EPA contracted with Camp, Dresser and McKee, Inc. (CDM) to perform an Initial Site Characterization (ISC) to determine: 1) the quality and quantity of contaminants at or produced by the landfill; 2) pathways by which these contaminants may leave the site; and 3) the potential impacts of the contaminants.

CDM made a initial site visit on October 17-18, 1985 and developed a workplan for the site characterization which was finalized on June 2, 1986. Sampling of ground waters, surface waters and landfill leachate was performed March 10-16, 1987. Additionally, reconnaisance level air quality monitoring, and a geologic reconnaisance were performed. The Final Initial Site Characterization report was submitted September 18, 1987.

The September 18, 1987 ISC report concluded that:

- Surface flow through the landfill was the source of leachate flows with the uncompacted landfill allowing for retention of rain and surface inflow to produce the perennial leachate flow. There was no indication of a spring.

- The geologic reconnaisance indicated that the landfill is underlain by fine grained volcanic deposits of very low permeability, with an absence of any carbonate deposits. On this basis and corroborated by the ground water studies, the site appears to be hydrologically isolated from the limestone aquifer. Groundwater flow is expected to be along the bedding planes toward the Lonfit River and away from the suspected fault. There was no indication of presence of a fault at the site. Follow-up monitoring to confirm the hydrologic isolation of the site from Guam's sole source drinking water aquifer is recommended due to data limitations from the geologic reconnaisance.

- The water quality sampling was performed only during Guam's dry season and was limited in number of samples. The samples indicated a general absence of organic contaminants at the time of sampling. The contract detection limit for vinyl chloride was not sufficiently low to ascertain compliance with the MCL. Two organic contaminants were detected at levels below the contract detection limits but above the instrument detection limits indicating the presence of some organics at low levels. The samples indicated an increase in inorganic constituents downgradient of the landfill which, however, did not exceed MCLs for any inorganic constituent. Secondary MCLs were exceeded only for Iron and Manganese, and no adverse health effects would be expected. Several metals were present in the landfill leachate and downgradiant groundwater samples in excess of EPA ambient water quality criteria (AWQC). However, based upon the observed relative flow of leachate and the Lonfit River, adequate dilution is expected to be available. No significant impact on the Lonfit River was observed under conditions at the time of sampling. Groundwater in the site vicinity is not used for drinking or other purposes.

- The air quality reconnaisance indicated the presence of minor amounts of methane, predominantly in the older landfill portions. No other air quality problems were observed.

The ISC report made clear recommendations for a remedial program to improve landfill operation practices to prevent or minimize any threats to human health and the environment posed by disposal practices at Ordot. The remedial program includes:

- implementation of perimeter control of surface flow run-on to prevent current flow through the landfill;
- capping unused portions of the landfill; and
- continued monitoring to demonstrate the effectiveness of the improved practices and substantiate the conclusions of the ISC.

B. SITE GEOLOGY

B.I. REGIONAL GEOLOGY

Guam is the largest and southernmost island in the Mariana Island Chain. The island chain is located atop a large submarine ridge known as the Mariana Island Arc System, which is the boundary between subducting tectonic plates. The Mariana Trench is located east and south of the arc. Guam has two major physiographic divisions (Figure 1-1). The southern half of the island is the oldest and is characterized primarily by a dissected and relatively rugged volcanic upland, on which limestones were sometimes deposited. Ordot Landfill is located in the northern part of this physiographic area.

The northern half of the island is characterized by a broad and gently undulating limestone plateau which slopes from Mount Santa Rosa (elevation 858 feet) on the northeast toward the Agana Swamp area (near sea level) on the southwest (Figure 1-1). The Limestone Plateau ends abruptly in near vertical cliffs along most of the coast line of nothern Guam. Volcanic rocks are exposed at the ground surface near the tops of Mount Santa Rosa and Mataguac Hill and form the surface expressions of the volcanic backbone on which the thick sequences of limestone were desposited. The rocks of the northern province probably formed from volcanic events that are both separate and younger than those in the south.

Limestone sequences grew on the submerged volcanic surfaces as they were uplifted, and eventually connected with the southern half of the island. The two physiographic provinces may be separated by a major northwest-southeast trending fault, located northeast of Ordot Landfill.

At this time, the island appears to be in a period of relative quiesence, with active fringing reefs being formed around the coast of the Northern Plateau. However, because tectonic activity

is still on-going in the region of the Mariana Trench, uplift of the island arc and Guam is expected to continue into the geologic future.

B.II. GEOLOGIC MATERIALS BENEATH THE SITE

The geologic materials which underlie the site consist of thinly bedded, tuffaceous shales and sandstones, with grain sizes ranging from clay to medium-grained sand (Tracey, et. al., 1963). Bedding ranges from a few millimeters to several meters in thickness. Typically, these deposits range in color from gray to light orange in fresh exposures and gray-green to dark red in weathered exposures. Gray-green beds are usually indicative of the coarser-grained tuffaceous sandstones, with the darker colored beds associated with the higher silica content of the matrix material.

Most of the rocks observed at the site exhibited varying degrees of weathering. In most unweathered exposures, the tuffs are fairly hard, but show chemical altering around individual angular grains. With weathering, the fine-grained matrix material breaks down to clay and the grains continue to weather, eventually to clay with little evidence of the original clastic texture. Weathering is prominent in most of the rocks exposed in the upper two to three feet of the surface. Rocks with little sign of weathering are exposed in the area used by the landfill operators as a source of cover material and in road cuts in and near the site. These unweathered rocks originally existed over ten feet below the ground surface. The weathered rocks, because of their high clay content, appear to have extremely low permeabilities. Unweathered rocks, because of their fine-grained matrix and partially altered clastic texture, also appear to have low permeabilities.

B.III. STRUCTURAL GEOLOGY

The rocks beneath the site are moderately folded and fractured. Bedding is folded into an anticline with an east-west axis. The north limb of the anticline dips 15 to 50 degrees. The south limb dips between 40 and 60 degrees. Folding is common within beds and appears to be due to depositional features. Fracturing was commonly observed in the rocks. However, most of the fractures are closed and, as such, may inhibit groundwater movement.

Major faulting was not observed in the beds exposed in or adjacent to the site area. Tracey, et. al. (1964) indicated a major northwest-southeast trending fault which passes just north of the Ordot site. This fault is thought to divide the northern limestones and the southern vocanics. Reconnaissance of the area did not substantiate the existence or absence of this fault. The steep terrain north of the site could be explained as either a major block fault or as a terrace (erosional) feature. A spring was thought to issue from the fault zone and subsequently flow

through the site. However, on closer examination of the area, topography of the area appears to concentrate surface runoff and channel it into the site.

B.IV. RESULTS OF GEOLOGIC RECONNAISSANCE

The results of the geologic reconnaissance indicate that the landfill is underlain by fine-grained volcanic deposits. These deposits appear to be of very low permeability, based on observations of the surficial material.

There does not appear to be any of the carbonate deposits present in the immediate site vicinity, based on available outcrop information. One of the initial concerns about the Ordot landfill site was the potential for leachate contaminating the limestone aquifer through a fault suspected to be in the vicinity. However, the site appears to be hydrologically isolated from the limestone aquifer based on the observations associated with the geologic reconnaissance. Furthermore, any groundwater on site would probably flow along bedding planes or along the contact between the landfill material and the bedrock deposits, both of which dip to the south away from the island's major limestone aquifer toward the Lonfit River. Therefore, there does not appear to be a pathway for groundwater contamination to affect the limestone aquifer. Because the geologic reconnaisance was limited in scope, confirmatory monitoring to further substantiate the isolation of the site from the sole source aquifer is appropriate. The design of this monitoring program will be based upon further hydrogeologic studies at the site and in the vicinity of the site necessary to define the program.

C. SITE HYDROLOGY

C.1. PRECIPITATION

The rainfall record indicates two distinct seasons in Guam. The dry season runs from January through June, during which time showers produce most of the little rain that falls. The seasonal average rainfall during the dry season is approximately 5 inches per month.

The wet season, runs from July through December. The wet season rainfall is produced from major regional storm systems, during which the seasonal average rainfall is about 12 inches per month. The maximum monthly rainfall for the season generally occurs in August and September and has historically ranged to over 30 inches per month, but averages about 14 inches per month. During typhoons, rainfall intensities are extreme and can be as much as eight inches in two hours, 18 inches in 12 hours, and 24 inches in 24 hours (Tracey, et al; 1964). However, the long-term

records show that monthly and annual rainfall are rather consistent on Guam, with the exception of high intensity rain generated during the occasional strong typhoons.

Unlike southern Guam, northern Guam does not have a well established, incised drainage system because the limestones are so permeable that rainfall almost immediately infiltrates upon reaching the ground. In developed areas of the interior, run-off over streets is usually diverted to open trenches, or to dry wells. Upon reaching storm water retention areas, the run-off infiltrates. In southern Guam, the volcanics weather to a relatively thick, impermeable soil zone. As a result, most of the rainfall ends up as surface runoff which eventually flows to the ocean in well established drainage courses, such as the Lonfit and Pago Rivers.

C.2. GROUNDWATER PRODUCTION

The water supply of northern Guam comes almost exclusively from the limestone aquifers of the Northern Plateau. Except for a few privately owned wells in northern Guam, the production from the groundwater system is managed by the Public Utility Agency of Guam (PUAG), the Air Force, and the Navy. There are presently over 70 municipal wells and one infiltration tunnel in operation in northern Guam. These facilities have a maximum capacity to yield about 21 million gallons per day (MGD).

Only a few low-yielding wells have been drilled in southern Guam. Water wells have not been drilled in the volcanics near Ordot Landfill.

C.3. GROUNDWATER MOVEMENT BENEATH THE SITE

The site appears to be geologically isolated from the limestones of the Northern Lens Aquifer. The high clay content of the tuffaceous shales and sandstones appears to restrict infiltration of rainfall or surface inflow. As such, most of the water that enters the area, either as rainfall or as surface inflow, will flow south along the original ground topographic surface into the Lonfit River. However, rainfall at the site may result in a significant amount of infiltration into the landfill debris due to the inadequate cover utilized at the site.

The background monitoring well in the northern part of the site contained only a small amount of water, indicating extremely low permeabilities for the rocks underlying the site. The apparently small amount of groundwater which flows through the site area probably follows the solid waste bedrock contact, which dips in a southerly direction beneath most of the site toward the Lonfit River. Groundwater beneath the southern portion of the site appears to be related to the alluvium associated with the Lonfit River. The groundwater gradient in the alluvium probably

follows the topography and, as such, flows parallel to the Lonfit River and eventually enters Pago Bay on the eastern shore of the island.

D. WATER QUALITY ANALYSIS

CDM performed field sampling March 10-16, 1987 to determine quality of surface water, ground water and leachate in the vicinity of the site or potentially impacted by the site. This sampling effort was for purposes of making an initial site characterization and therefore limited numbers of samples were taken. The samples were collected during Guam's dry season where average monthly rainfall is 5 inches versus a 12 inch per month average (with short intense storms) during the rainy season. Although sampling during the dry season may represent worst-case with respect to contaminant loading, this assumption could be incorrect if channeling of flows within the landfill occurs during low flow conditions. Additional sampling would be required to fully characterize the site with respect to seasonal variation in flows and concentrations, and to expand the current data base.

As detailed in the following analysis of results, the sampling results indicated that although the landfill leachate and downgradient groundwater are generally poor quality with respect to inorganic constituents, essentially no volatiles, semi-volatiles, or pesticides/PCBs were detected in any samples. Analysis of downgradient groundwater samples indicated the presence of barium, iron, manganese, zinc, vanadium and aluminum. Leachate samples contained these metals and additionally chromium, cobalt, copper, cyanide, potassium and lead. Although no samples exceeded the inorganic primary maximum contaminant levels (MCLS), secondary MCLs were exceeded for iron and manganese in leachate samples and downgradiant groundwater. Comparison of concentrations of metals in groundwater and leachate to Ambient Water Quality Criteria (AWQC) for freshwater aquatic life show some concentrations are in excess of these criteria. However, based upon the observed relative flow of leachate and the Lonfit River, adequate dilution is expected to be available. No significant impact on the Lonfit River was observed under conditions at the time of sampling. The Endangerment Assessment addresses the potential impacts of these contaminants on human health and the environment.

D.1. ANALYTICAL DATA

All of the surface water, groundwater and leachate samples collected during the sampling effort were analyzed for Routine Analytical Services Hazardous Substances List (RAS HSL) volatile, semi-volatile, pesticide/PCB, and inorganic constituents. All data were validated by Region 9 using standard review protocols and the data quality was considered in analysis of the data and in reaching the decision.

The following samples were taken and the results of the laboratory analysis are reported in Table 3-2 (from the ISC) for surface water and Table 3-3 (from the ISC) for groundwater:

Sample Number	Description	Sample Number	Description
SW-01	Lonfit River, upstream of landfill	GW-01	Municipal Well A-11
SW-02	Lonfit River, downstream of landfill	GW-03	Municipal Well A-12
SW-05	Leachate spring, south side of landfill	GW-04	WERI Background Monitoring Well
SW-07	Leachate pond area, south side of landfill	GW-05	WERI Downgradient Monitoring Well
SW-10	Leachate stream, west	GW-06	WERI Well #4 Downgradient

Duplicate sample pairs are as follows: GW-01 and GW-02; SW-02 and SW-13; and GW-06 and GW-07.

D.2 ANALYSIS OF DATA

Inspection of the data indicate that water quality of the leachate is generally poor, particularly considering the high concentrations of the inorganic constituents. However, none of the inorganic constituents exceed the USEPA maximum contaminant limits (MCLs), although iron and manganese generally exceed the secondary maximum contaminant limits (SMCLs) for all of the leachate samples. With regard to organic constituents, only trace levels of carbon disulfide and chlorobenzene were detected in sample SW-7, and phenol was detected in SW-10. Each of these constituents were detected in amounts below the Contract Recommended Detection Limit (CRDL) and are qualified as such. All of the other organic constituents analyzed under the CLP RAS program were either undetected or detected in the method blank, indicating laboratory contamination. The CRDL for vinyl chloride (10 ug/l) is not low enough to determine compliance with the MCL for vinyl chloride (2 ug/l).

Samples were also collected from the Lonfit River to determine the potential impact of the landfill on the water quality of the river. Sample SW-01 was collected from the Lonfit River upgradient of the landfill, whereas sample SW-02 was collected downgradient. Sample SW-13 represents a duplicate of SW-02.

OPDOT LANDFILL
SURFACE WATER/LEACHATE SAMPLE RESULTS

	SAMPLING LOCATION											
	SAMPLE LOCATION -->	SW-01	SW-02		SW-05		SW-07		SW-10		SW-13	
	Date sample taken -->	03/12/87	03/12/87		03/12/87		03/13/87		03/14/87		03/12/87	
	QA\QC Information -->		Dup. of SW-13								Dup. of SW-02	
SERIES / CONTAMINANT NAME	CAS #	UNIT	RESULTS	DETECT	RESULTS	DETECT	RESULTS	DETECT	RESULTS	DETECT	RESULTS	DETECT	RESULTS	DETECT
BASE NEUTRAL/ACID EXTRACTABLE														
BIS(2-ETHYLHEXYL) PHTHALATE	117-81-7	ug/L	10.00 U	10.00	10.00 U	10.00	10.00 U	10.00	10.00 U	10.00	3.00 JB	10.00	2.00 JB	10.00
PHENOL	108-95-2	ug/L	10.00 U	10.00	10.00 U	10.00	10.00 U	10.00	10.00 U	10.00	3.00 J	10.00	10.00 U	10.00
METALS														
ALUMINUM	7429-90-5	ug/L	80.00	31.00	75.00	31.00	460.00	31.00	3583.00	31.00	150.00	31.00	70.00	31.00
ANTIMONY	7440-36-0	ug/L	20.00 U	20.00	20.00 U	20.00	20.00 U	20.00	20.00 U	20.00	20.00 U	20.00	20.00 U	20.00
ARSENIC	7440-38-2	ug/L	10.00 U	10.00	10.00 U	10.00	10.00 U	10.00	10.00 U	10.00	10.00 U	10.00	10.00 U	10.00
BARIUM	7440-39-3	ug/L	5.00	0.90	4.00	0.90	54.00	0.90	307.00	0.90	113.00	0.90	4.00	0.90
BERYLLIUM	7440-41-7	ug/L	0.20 U	0.20	0.20 U	0.20	0.20 U	0.20	0.29 U	0.20	0.20 U	0.20	0.20 U	0.20
CADMIUM	7440-43-9	ug/L	4.30 U	4.30	4.30 U	4.30	4.30 U	4.30	4.30 U	4.30	4.30 U	4.30	4.30 U	4.30
CALCIUM	7440-70-2	ug/L	82150.00	24.00	82720.00	24.00	66200.00	24.00	85870.00	24.00	102700.00	24.00	42500.00	24.00
CHROMIUM	7440-47-3	ug/L	3.70 U	3.70	3.70 U	3.70	3.70 U	3.70	11.00	3.70	3.70 U	3.70	3.70 U	3.70
COBALT	7440-48-4	ug/L	6.00 U	6.00	6.00 U	6.00	6.00 U	6.00	13.00	6.00	6.00 U	6.00	6.00 U	6.00
COPPER	7440-50-8	ug/L	5.90 U	5.90	5.90 U	5.90	10.00	5.90	31.00	5.90	5.90 U	5.90	5.90 U	5.90
CYANIDE	74-90-8	ug/L	10.00 U	10.00	10.00 U	10.00	10.00 U	10.00	10.00 U	10.00	10.00	0.20	20.00 U	20.00
IRON	7439-89-6	ug/L	500.00	9.20	223.00 J	9.20	639.00	9.20	20260.00	9.20	203.00	9.20	110.00 J	9.20
LEAD	7439-92-1	ug/L	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00	18.00	2.00	5.30	2.00	5.00 U	5.00
MAGNESIUM	7439-95-4	ug/L	8765.00	60.00	9210.00	60.00	54290.00	60.00	69290.00	60.00	23500.00	60.00	9100.00	60.00
MANGANESE	7439-96-5	ug/L	20.00	0.60	5.00	0.60	142.00	0.60	3161.00	0.60	224.00	0.60	4.00	0.60
MERCURY	7439-97-6	ug/L	0.20 U	0.20	0.20 U	0.20	0.20 U	0.20	0.20 U	0.20	0.20 U	0.20	0.20 U	0.15
NICKEL	7440-02-0	ug/L	23.00 U	23.00	23.00 U	23.00	23.00 U	23.00	23.00 U	23.00	23.00 U	23.00	23.00 U	23.00
POTASSIUM	7440-09-7	ug/L	940.00 U	940.0	940.00 U	940.0	10740.00	940.0	22220.00	940.0	15050.00	940.0	940.00 U	940.0
SELENIUM	7782-49-2	ug/L	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00	25.00 U	25.00	5.00 U	5.00	5.00 U	5.00
SILVER	7440-22-4	ug/L	5.10 U	5.10	5.10 U	5.10	5.10 U	5.10	5.10 U	5.10	5.10 U	5.10	5.10 U	5.10
SODIUM	7440-23-5	ug/L	17000.00	20.00	18100.00	20.00	120000.00	20.00	119600.00	20.00	92070.00	20.00	19000.00	20.00
THALLIUM	7440-28-0	ug/L	10.00 U	10.00	10.00 U	2.00	10.00 U	10.00	10.00 U	10.00	10.00 U	10.00	10.00 U	10.00
TIN	7440-31-5	ug/L	17.00 U	17.00	17.00 U	17.00	17.00 U	17.00	17.00 U	17.00	17.00 U	17.00	17.00 U	17.00
VANADIUM	7440-62-2	ug/L	3.00	3.10	3.00	3.10	3.10 U	3.10	12.00	3.10	3.10 U	3.10	3.00	3.10
ZINC	7440-66-6	ug/L	9.00	1.30	10.00	1.30	31.00	1.30	73.00	1.30	9.00	1.30	10.00	1.30
VOLATILE ORGANICS														
1,1,2,2-TETRACHLOROETHANE	79-34-5	ug/L	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00
2-BUTANONE	78-93-3	ug/L	8.00 JB	10.00	8.00 JB	10.00	12.00 U	10.00	10.00 U	10.00	10.00 U	10.00	10.00 U	10.00
ACETONE	67-64-1	ug/L	2.00 JB	10.00	2.00 JB	10.00	5.00 JB	10.00	8.00 JB	10.00	10.00 U	10.00	10.00 U	10.00
CARBON DISULFIDE	75-15-0	ug/L	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00	1.00 J	5.00	5.00 U	5.00	5.00 U	5.00
CHLOROBENZENE	108-90-7	ug/L	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00	2.00 J	5.00	5.00 U	5.00	5.00 U	5.00
ETHYLBENZENE	100-41-4	ug/L	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00
METHYLENE CHLORIDE (DICHLOROMETHANE)	75-09-2	ug/L	5.00 U	5.00	2.00 JB	5.00	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00
STYRENE	100-42-5	ug/L	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00
TOLUENE	108-88-3	ug/L	1.00 JB	5.00	1.00 JB	5.00	1.00 JB	5.00	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00
XYLENES (TOTAL)	1330-20-7	ug/L	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00

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FOOTNOTES

U - The material was analyzed for, but was not detected. The associated numerical value is the estimated detection limit for that sample.

J - The associated numerical value is an estimated quantity because the amount detected is below the required limits or because quality control criteria were not met.

B - Compound was also detected in the blank. Quantity reported is less than 5 times the amount found in the blank (less than 10 times for methylene chloride, acetone, toluene, and phthalates).

R - Quality Control indicates that data is not usable (i.e. compound may may not be present). Resampling and reanalysis is necessary for verification.

UJB - The estimated sample detection limit was increased and the compound was also detected in the blank. The amount found in the sample was reported. The compound was detected at less than 5 times the amount in blank (less than 10 times for methylene chloride, acetone, toluene and phthalates).

EJ - The value reported was estimated due to interference problems (ICP serial dilution or on spike recovery by graphite furnace).

JB - The value is an estimated amount detected below required limits because quality control criteria were not met; the compound was also detected in the blank.

N - Tentative identification of a compound that is not on the Hazardous Substance List. Resampling and reanalysis is necessary for verification.

UJ - No contamination or analytical deficiencies; Quantitative limit was adjusted

JL - The value reported was estimate due to exceedint ICP linear range.

JS - The value reported was estimate due to spike recoveries outside limits.

JC - The value reported was estimate due to instrument calibration problems.

A - Benzo(b) and Benzo(k) Fluoranthene not separated due to matrix.

JN - Tentative identification of a compound that is not on the Hazardous Substance List. Resampling and reanalysis is necessary for verification.

TABLE 3-3

ODOT LANDFILL

GROUND WATER SAMPLE RESULTS

			SAMPLING LOCATION											
	SAMPLE LOCATION -->		GW-01		GW-02		GW-03		GW-04		GW-05		GW-06	
	Date sample taken -->		03/12/87		03/12/87		03/12/87		03/13/87		03/13/87		03/13/87	
	QA\QC information -->		Dup. of GW-02		Dup. of GW-01								Dup. of GW-07	
SERIES / CONTAMINANT NAME	CAS #	UNIT	RESULTS	DETECT	RESULTS	DETECT	RESULTS	DETECT	RESULTS	DETECT	RESULTS	DETECT	RESULTS	DETECT
BASE NEUTRAL/ACID EXTRACTABLE														
BIS(2-ETHYLHEXYL) PHTHALATE	117-81-7	ug/L	2.00 JB	10.00	10.00 U	10.00	2.00 JB	10.00	80.00	10.00	2.00 JB	10.00	5.00 JB	10.00
PHENOL	108-95-2	ug/L	10.00 U	10.00	10.00 U	10.00	5.00 J	10.00	10.00 U	10.00	10.00 U	10.00	10.00 U	10.00
METALS														
ALUMINUM	7429-90-5	ug/L	41.00	31.00	50.00	31.00	65.00	31.00	77.00	31.00	827.00	31.00	831.00	31.00
ANTIMONY	7440-36-0	ug/L	20.00 U	20.00	20.00 U	20.00	20.00 U	20.00	20.00 U	20.00	20.00 U	20.00	20.00 U	20.00
ARSENIC	7440-38-2	ug/L	10.00 U	10.00	10.00 U	10.00	10.00 U	10.00	10.00 U	10.00	10.00 U	10.00	10.00 U	10.00
BARIUM	7440-39-3	ug/L	6.00	0.90	6.00	0.90	5.00	0.90	9.00	0.90	190.00	0.90	15.00	0.90
BERYLLIUM	7440-41-7	ug/L	0.20 U	0.20	0.20 U	0.20	0.20 U	0.20	0.20 U	0.20	0.20 U	0.20	0.20 U	0.20
CADMIUM	7440-43-9	ug/L	4.30 U	4.30	4.30 U	4.30	4.30 U	4.30	4.30 U	4.30	4.30 U	4.30	4.30 U	4.30
CALCIUM	7440-70-2	ug/L	117000.00	24.00	116700.00	24.00	112000.00	24.00	52930.00	24.00	61610.00	24.00	85000.00	24.00
CHROMIUM	7440-47-3	ug/L	3.70 U	3.70	3.70 U	3.70	3.70 U	3.70	3.70 U	3.70	3.70 U	3.70	3.70 U	3.70
COBALT	7440-48-4	ug/L	6.00 U	6.00	6.00 U	6.00	6.00 U	6.00	6.00 U	6.00	15.00	6.00	6.00 U	6.00
COPPER	7440-50-8	ug/L	6.00	5.90	5.90 U	5.90	10.00	5.90	5.90 U	5.90	6.00	5.90	34.00 J	5.90
CYANIDE	74-90-8	ug/L	10.00 U	10.00	10.00 U	10.00	16.00	6.20	10.00 U	10.00	10.00 U	10.00	10.00 U	10.00
IRON	7439-89-6	ug/L	75.00	9.20	30.00	9.20	65.00	9.20	126.00	9.20	831.00	9.20	895.00	9.20
LEAD	7439-92-1	ug/L	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00
MAGNESIUM	7439-95-4	ug/L	6151.00	60.00	6107.00	60.00	3215.00	60.00	7691.00	60.00	31210.00	60.00	50130.00	60.00
MANGANESE	7439-96-5	ug/L	1.00	0.60	0.60 U	0.60	4.00	0.60	0.90	0.60	87.00	0.60	92.00	0.60
MERCURY	7439-97-6	ug/L	0.20 U	0.20	0.20 U	0.20	1.00 J	0.15	0.20 U	0.20	0.20 U	0.20	0.20 U	0.20
NICKEL	7440-02-0	ug/L	23.00 U	23.00	23.00 U	23.00	23.00 U	23.00	23.00 U	23.00	32.00	23.00	23.00 U	23.00
POTASSIUM	7440-09-7	ug/L	940.00 U	940.0	940.00 U	940.0	940.00 U	940.0	940.00 U	940.0	940.00 U	940.0	940.00 U	940.0
SELENIUM	7782-49-2	ug/L	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00
SILVER	7440-22-4	ug/L	5.10 U	5.10	5.10 U	5.10	5.10 U	5.10	5.10 U	5.10	5.10 U	5.10	5.10 U	5.10
SODIUM	7440-23-5	ug/L	11110.00	20.00	11040.00 U	20.00	9874.00	20.00	12900.00	20.00	30050.00	20.00	62130.00	20.00
THALLIUM	7440-28-0	ug/L	10.00 U	10.00	10.00 U	10.00	10.00 U	10.00	10.00 U	10.00	10.00 U	10.00	10.00 U	10.00
TIN	7440-31-5	ug/L	17.00 U	17.00	17.00 U	17.00	17.00 U	17.00	17.00 U	17.00	17.00 U	17.00	17.00 U	17.00
VANADIUM	7440-62-2	ug/L	3.10 U	3.10	3.10 U	3.10	3.10 U	3.10	3.10 U	3.10	3.60	3.10	6.90	3.10
ZINC	7440-66-6	ug/L	60.00	1.30	62.00	1.30	65.00	1.30	20.00	1.30	127.00	1.30	102.00	1.30
VOLATILE ORGANICS														
1,1,2,2-TETRACHLOROETHANE	79-34-5	ug/L	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00
2-BUTANONE	78-93-3	ug/L	10.00 U	10.00	10.00 U	10.00	10.00 U	10.00	10.00 U	10.00	10.00 U	10.00	9.00 JB	10.00
ACETONE	67-64-1	ug/L	10.00 U	10.00	4.00 JB	10.00	3.00 JB	10.00	3.00 JB	10.00	3.00 JB	10.00	3.00 JB	10.00
CARBON DISULFIDE	75-15-0	ug/L	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00
CHLOROBENZENE	108-90-7	ug/L	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00
ETHYLBENZENE	100-41-4	ug/L	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00
METHYLENE CHLORIDE (DICHLOROMETHANE)	75-09-2	ug/L	5.00 U	5.00	5.00 U	5.00	2.00 JB	5.00	5.00 U	5.00	2.00 JB	5.00	5.00 U	5.00
STYRENE	100-42-5	ug/L	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00
TOLUENE	108-88-3	ug/L	5.00 U	5.00	5.00 U	5.00	1.00 JB	5.00	1.00 JB	5.00	5.00 U	5.00	1.00 J	5.00
XYLENES (TOTAL)	1330-20-7	ug/L	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00	5.00 U	5.00

Table 3:

GROUND WATER SAMPLE RESULTS

SAMPLING LOCATION

SAMPLE LOCATION --> GW-07
Date sample taken --> 03/13/97
QA\QC Information --> Dup. of GW-06

SERIES / CONTAMINANT NAME	CAS #	UNIT	RESULTS	DETECT
BASE NEUTRAL/ACID EXTRACTABLE				
BIS(2-ETHYLHEXYL) PHTHALATE	117-81-7	ug/L	3.00 JB	10.00
PHENOL	108-95-2	ug/L	10.00 U	10.00
METALS				
ALUMINUM	7429-90-5	ug/L	875.00	31.00
ANTIMONY	7440-36-0	ug/L	20.00 U	20.00
ARSENIC	7440-38-2	ug/L	10.00 U	10.00
BARIUM	7440-39-3	ug/L	11.00	0.00
BERYLLIUM	7440-41-7	ug/L	0.20 U	0.20
CADMIUM	7440-43-9	ug/L	0.30 U	0.30
CALCIUM	7440-70-2	ug/L	80079.00	24.00
CHROMIUM	7440-47-3	ug/L	3.70 U	3.70
COBALT	7440-48-4	ug/L	6.00 U	6.00
COPPER	7440-50-8	ug/L	10.00	5.00
CYANIDE	74-90-8	ug/L	10.00 U	10.00
IRON	7439-89-6	ug/L	1010.00	9.20
LEAD	7439-92-1	ug/L	5.00	2.00
MAGNESIUM	7439-95-4	ug/L	61900.00	40.00
MANGANESE	7439-96-5	ug/L	81.00	0.00
MERCURY	7439-97-6	ug/L	0.20 U	0.20
NICKEL	7440-02-0	ug/L	23.00 U	23.00
POTASSIUM	7440-09-7	ug/L	940.00 U	940.0
SELENIUM	7782-49-2	ug/L	5.00 U	5.00
SILVER	7440-22-4	ug/L	5.10 U	5.10
SODIUM	7440-23-5	ug/L	65710.00	20.00
THALLIUM	7440-28-0	ug/L	10.00 U	10.00
TIN	7440-31-5	ug/L	17.00 U	17.00
VANADIUM	7440-62-2	ug/L	0.30	3.10
ZINC	7440-66-6	ug/L	133.00	1.30
VOLATILE ORGANICS				
1,1,2,2-TETRACHLOROETHANE	79-34-5	ug/L	5.00 U	5.00
2-BUTANONE	78-93-3	ug/L	10.00 U	10.00
ACETONE	67-64-1	ug/L	10.00 U	10.00
CARBON DISULFIDE	75-15-0	ug/L	5.00 U	5.00
CHLOROBENZENE	108-90-7	ug/L	5.00 U	5.00
ETHYLBENZENE	100-41-4	ug/L	5.00 U	5.00
METHYLENE CHLORIDE (DICHLOROMETHANE)	75-09-2	ug/L	5.00 U	5.00
STYRENE	100-42-5	ug/L	5.00 U	5.00
TOLUENE	108-88-3	ug/L	5.00 U	5.00
XYLENES (TOTAL)	1330-20-7	ug/L	5.00 U	5.00

Table

FOOTNOTES

U - The material was analyzed for, but was not detected. The associated numerical value is the estimated detection limit for that sample.

J - The associated numerical value is an estimated quantity because the amount detected is below the required limits or because Quality control criteria were not met.

B - Compound was also detected in the blank. Quantity reported is less than 5 times the amount found in the blank (less than 10 times for methylene chloride, acetone, toluene, and phthalates).

R - Quality Control indicates that data is not usable (i.e. compound may may not be present). Resampling and reanalysis is necessary for verification.

UB - The estimated sample detection limit was increased and the compound was also detected in the blank. The amount found in the sample was reported. The compound was detected at less than 5 times the amount in blank (less than 10 times for methylene chloride, acetone, toluene and phthalates).

UJ - The value reported was estimated due to interference problems (ICP serial dilution or no spike recovery by graphite furnace).

JB - The value is an estimated amount detected below required limits because quality control criteria were not met; the compound was also detected in the blank.

N - Tentative identification of a compound that is not on the Hazardous Substance List. Resampling and reanalysis is necessary for verification.

NJ - No contamination or analytical deficiencies; Quantitative limit was adjusted

JL - The value reported was estimate due to exceeded ICP linear range.

JS - The value reported was estimate due to spike recoveries outside limits.

JC - The value reported was estimate due to instrument calibration problems.

B - Benzo(b) and Benzo(k) Fluoranthene not separated due to matrix.

JN - Tentative identification of a compound that is not on the Hazardous Substance List. Resampling and reanalysis is necessary for verification.

Examination of the data for the Lonfit River indicate that the water quality is generally better than the leachate quality. This is particularly true for the inorganic constituents, which in many cases are an order of magnitude less than the inorganic constituent concentrations detected in the leachate samples. In addition, none of the constituent concentrations detected in the Lonfit River exceeded the MCLs or SMCLs, and none of the organic constituents were detected in any of the samples. Finally, comparison of the data for the downgradient sample (SW-02) with the data from the upgradient sample (SW-01) indicates that the leachate discharging to the Lonfit River had little impact on the river water quality at the time of the sampling effort. For example, a comparison between many of the major ions in the samples indicate that there was little to no change in the water quality. However, based upon observed practices at the landfill, an impact on the river may occur due to improper disposal of highly contaminated wastes resulting in a more highly contaminated leachate discharge to the river over a short time period.

Samples GW-01 and GW-03 were collected from municipal wells located in the vicinity of the landfill. Sample GW-02 represents a duplicate of GW-01. Samples GW-04, GW-05, and GW-06 were collected from monitoring wells located within the site boundary. Samples GW-07 represents a duplicate of GW-06. Sample GW-04 was collected from the upgradient monitoring well.

The samples collected from the on-site downgradient monitoring wells (GW-05 and GW-06) show a general degradation in water quality when compared to the sample collected from the upgradient well (GW-04). For the most part, every major inorganic constituent increased in concentration downgradient. In some cases, there was an order of magnitude increase in concentration (e.g., sodium, zinc). Furthermore, iron and manganese in both of the downgradient groundwater samples exceeded the SMCLs. Organic constituents were not detected in any of the on-site monitoring wells, with the exception of a phthalate in the upgradient well. The presence of phthalate indicates the possible presence of plasticides.

The water quality data for the samples collected from the off-site municipal wells are similar to the data for the upgradient monitoring well, when considering the concentration of some of the major metals such as sodium and magnesium. In that the water quality is similar to the upgradient well and there does not appear to be a degradation in water quality similar to that observed in the downgradient monitoring wells, it appears that the off-site municipal wells are unaffected by the landfill.

Phenol was detected at a concentration of 5.0 ug/l in sample GW-03. However, this value was qualified since it was detected below the CRDL. The source of the phenol is not known. No other organic constituents were detected in the off-site municipal wells sampled.

E. AIR SAMPLING

A reconnaisance air sampling effort was conducted at Ordot Landfill using portable field instruments.

The results of the reconnaissance-level air quality survey indicate that air emissions from the landfill do not present a major problem. For example, the average response of most of the instruments along the transects were either zero or not above background levels. The exceptions were the responses observed for the Organic Vapor Analyzer (OVA). In general, the OVA consistently maintained readings on the order of 2 to 7 ppm above background over the entire transect. In addition, at several locations along the transects, elevated readings on the OVA were observed, particularly along the southern portions of the landfill. The OVA readings obtained at these locations ranged from 2 to 100 ppm, although the upper levels generally represented short spikes which were not sustained for extended periods of time.

The type of instrument responses observed at the landfill suggest that small amounts of methane are being produced and emitted from the landfill. For example, the HNu, which does not respond to methane gas, did not respond while conducting the transects. However, the OVA, which does detect methane gas, generally responded above background along the entire course of the transects. These instruments would not detect emissions of chlorinated hydrocarbons and if future sampling indicates presence of chlorinated hydrocarbons at the landfill, additional monitoring to screen for air emissions is recommended.

The reconnaissance-level air sampling data collected indicates that methane is being produced from the southern portion of the landfill. This portion of the landfill is the oldest and, consequently, the waste has had the most opportunity to degrade. However, other portions of the landfill are presently not generating much methane. Furthermore, the instrument responses at the southern portions of the landfill were not sustainable at the higher levels, indicating that the methane production was not sustainable. Given these aspects, it appears that the landfill does not represent an air quality problem.

VI. ENDANGERMENT ASSESSMENT

ICF/Clements was tasked to write an Endangerment Assessment (EA) report to evaluate the magnitude and probability of actual or potential threat to public health or welfare and the environment posed by the hazardous substances present at the site. The EA, based on the limited data from the Initial Site Characterization, supports the conclusion that current conditions at the landfill do not demonstrate a significant and substantial endangerment to human health or the environment with regard to hazardous contaminant impact appropriate for response under CERCLA authorizations.

VII. SELECTED ALTERNATIVE

The Superfund law requires that each remedy selected for a site must be protective of human health and the environment, cost effective, and in accordance with statutory requirements. Permanent solutions to toxic waste contamination problems are to be achieved wherever possible. According to the National Contingency Plan under which the Superfund program operates, specifically 40 CFR Part 300.68(j), the cost-effective remedy is the lowest cost alternative that is technically feasible and reliable and which effectively mitigates and minimizes damages to and provides adequate protection of public health, welfare, and the environment.

EPA has determined, based on the available information, that remedial action at the Ordot Landfill site under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund) 42 U.S.C. Section 9605 et seq. is inappropriate at this time.

This determination is based on several facts: 1) Ordot Landfill is an operating municipal landfill; 2) all but approximately 4-7 acres of the 47 acre site are active waste disposal areas; 3) the 4-7 inactive acres are downgradient or adjacent to the active waste disposal areas; 4) any remedy for these inactive areas likely will be affected by activities at the active waste disposal areas or continued surface flow through the landfill; 5) the bulk of any environmental impacts from the landfill will result from activities at the active waste disposal areas; 6) the landfill, by applying standard operation practices to control landfill leachate, can effectively reduce or eliminate the release of leachate to receiving waters; 7) EPA has issued an order under the Clean Water Act, 33 U.S.C. Section 1251 et seq., that requires the Guam Department of Public Works to cease discharge of leachate from Ordot Landfill to the Lonfit River; and 8) EPA data, although too limited for comprehensive conclusions, has not demonstrated an imminent and substantial endangerment to human health or welfare or the environment.

EPA concludes that threats to human health and the environment currently identified at the landfill are due to poor operation practices and can best be accomplished through addressing operations and maintenance of the landfill itself including improved leachate control measures consisting of capping and surface water control. EPA concludes that the appropriate mechanism for implementing these controls is through enforcement of the Clean Water Act. The responsibility for implementing these controls lies with the landfill operator, the Territory of Guam. Expenditures from the Superfund are not appropriate for these purposes.

Further, EPA concludes that any remedial action to address the inactive portions of the landfill potentially appropriate for CERCLA response would be jeopardized or nullified unless operation practices at the active disposal areas are improved to reduce leachate formation and to prevent discharge of leachate. The design for improved operations at the active disposal areas must consider the inactive portions due to the nature of the site and thus would make a separate CERCLA action unnecessary.

Based on these considerations, EPA is choosing no action as the preferred alternative. As part of the preferred alternative, EPA will continue to gather additional data to identify any adverse impacts on human health or the environment attributable to the landfill not currently identified and remediated by the improved landfill operation practices. As part of this continued monitoring program at Ordot Landfill, EPA will monitor to detect as early as possible any migration of contaminants from the landfill toward the sole source aquifer. The design of this program will be based upon further hydrogeological investigations at the site and in the vicinity of the site to characterize geologic and hydrologic features necessary to define the monitoring program.

In choosing the no further action alternative EPA reserves its authority to perform additional response actions should the new information warrant such a decision.

30 SEP 1988

ORDOT LANDFILL
GUAM

RESPONSIVENESS SUMMARY

This responsiveness summary is required by Superfund policy for the purpose of providing EPA and the public with a summary of citizen comments and concerns about the site, as raised during the public comment period, and EPA's responses to those concerns. All comments received are factored into EPA's final decision for a site.

For the Ordot Landfill site, community involvement was solicited at the conclusion of EPA's Phase I Remedial Investigation (the Initial Site Characterization). A notice of the availability of EPA's Proposed Remedial Action Plan (PRAP) with supporting documentation was published on June 27, 1988 in Guam's Pacific Daily News. The notice identified EPA's and Guam EPA's preferred alternative of no action for this site under CERCLA. A public comment period was conducted from July 12, 1988 through August 12, 1988. EPA held a public meeting on July 26, 1988 at Guam EPA's offices in Harmon, Guam. Press releases and notification to the Commissioner of Ordot/Chalan Pago, the nearest village to the landfill, and to Senator Sam Agustin of the Guam legislature's Committee on Health were prepared and made by Guam EPA to further assure notification of the affected community and their representatives.

EPA received no comments from the community at the public meeting and no written comments were received during the public comment period. On that basis EPA is unaware of any community concerns that have not been addressed by the preferred alternative of no action at the Ordot Landfill site under CERCLA.

ORDOT LANDFILL SUPERFUND SITE
Ordot, Guam

ADMINISTRATIVE RECORD INDEX
(Indexed by Date)

This Index Was Compiled July 1, 1988 and Includes Documents 1-75

ORDOT LANDFILL SUPERFUND SITE
Ordot, Guam

ADMINISTRATIVE RECORD INDEX
(Indexed by Date)

This Administrative Record Index lists the documents contained in the Administrative Record for the Ordot Landfill Superfund Site in Ordot, Guam. The index presents the documents in ascending chronological order, which is consistent with the arrangement of the documents in the Administrative Record itself.

The documents contained in the Administrative Record were used by the U.S. Environmental Protection Agency in identifying remedial activities appropriate for use at the Ordot Landfill Superfund Site.

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DOC. #	DATE	FROM/ORGANIZ.	TO/ORGANIZ.	DESCRIPTION/SUBJECT	PAGES
37	11/18/80	Dan W. Crytser, Guam EPA	Tom Jones, EPA Region IX	Cover ltr. with attached progress report for the Ordot Landfill engineering plan (Re: GMP Assoc.)	7
60	06/24/81	Dan Crytser, Guam EPA	US EPA	Notification of Hazardous Waste Site, Ordot Landfill	10
50	08/06/81	Dr. Jake MacKenzie, EPA Region IX	Ricardo C. Duenas, Administrator, Guam EPA	Ltr: Seeking EPA Guam verification of Ordot Landfill as priority site	1
49	08/27/81	Dr. Jake MacKenzie, EPA Region IX	Ricardo C. Duenas, Administrator, Guam EPA	Ltr: Transmittal of NOTIS printout showing hazardous waste TSD sites in Guam	1
30	10/08/81	Ricardo C. Duenas, Administrator, Guam EPA	Dr. Jake MacKenzie, EPA Region IX	Ltr: With attached Mitre model components and Mitre model (Superfund) verification	43
48	10/26/81	Ricardo C. Duenas, Administrator, Guam EPA	Dr. Jake MacKenzie, EPA Region IX	Ltr: Re: Hazardous waste pollution threat at Ordot Landfill	1
29	12/24/81	Willian Flores, Public Works, Guam	Carl Aguan, Dir. of Public Works, Guam	Memo: Ordot Landfill requirements (Re: 12/18/81 inspection)	3
47	01/25/82	Ricardo C. Duenas, Administrator, Guam EPA	Sonia F. Crow, Administrator, EPA Region IX	Ltr: Transmittal of attached verification documents for Mitre hazardous waste site ranking model	32
33	01/26/82	Howard Harris, NOAA, OMPA	Keith A. Takata, EPA Region IX	ROC: Harris called Takata Re: Interim Priority List sites	1

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45	02/26/82	David S. Mowday, EPA Region IX	Ricardo C. Duenas, Administrator, Guam EPA	Ltr: Update on current Superfund activities, including Ordot Landfill	1
44	05/03/82	William N. Hedeman, Jr., US EPA	Rita M. Lavelle, US EPA	Memo: Requesting authorization to undertake remedial planning at four sites, including Ordot Landfill	5
43	06/01/82	Sonia F. Crow, Administrator, EPA Region IX	Paul M. Calvo, Governor, Guam	Ltr: Approval of Guam's request for CERCLA remedial action at ORDOT Landfill	2
57	07/10/82	Daily News Staff	Newspapers Readers	News: "EPA team coming to Guam for hazardous waste study"	1
31	07/28/82	Sonia F. Crow, EPA Region IX, William McAlister, EPA Guam, and Paul M. Calvo, Governor, Guam	Public Record	Agreement between the Territory of Guam and Region IX of the US EPA for FY-83	6
42	07/29/82	Norman L. Lovelace, EPA Region IX	Nachaa Siren, Environmental Protection Board, Trust Territories	Ltr: Transmittal of draft RI statement of work	2
41	08/24/82	Norman L. Lovelace, EPA Region IX	Ricardo C. Duenas, Administrator, Guam EPA	Ltr: Transmittal of RI comprehensive Work Plan	1
56	08/30/82	James B. Branch, Administrator, Guam EPA	Norman L. Lovelace, EPA Region IX	Ltr: Response to EPA Region IX request to document Guam EPA activities to involve public in RI and action	2

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32	10/22/82	Norman L. Lovelace, EPA Region IX	Joseph Egan, World Information Systems	Ltr: Response to 10/18/82 letter requesting Pacific Basin hazardous waste information	2
40	10/27/82	David S. Monday, EPA Region IX	Ricardo C. Duenas, Administrator, Guam EPA	Ltr: Current Superfund actions regarding hazardous waste in Insular Territories (Including Ordot Landfill)	2
26	11/01/82	Keith A. Takata, EPA Region IX	Stephen Caldwell, US EPA	Memo: HRS scores for Region IX sites - documentation for Insular Territories (10/25/82 HRS package for Ordot attached)	15
39	11/03/82	Keith A. Takata, EPA Region IX	Stanley L. Carlock, P.E., U.S. Army Corps of Engineers	Ltr: Discussion of Corps role in RI/FS project	1
75	12/01/82	CDM & Barret, Harris & Assoc.	Guam EPA	Final Rpt: "Northern Guam Lens Study, Groundwater Management Program, Aquifer Yield Report"	219
34	01/13/83	Kathleen G. Shimmin, EPA Region IX	EPA Region IX	Issue: What is the status of the sites of the Insular Territories under CERCLA?	3
74	05/20/83	Vernon M. Reid, Black & Veatch	Nancy Willis, US EPA	Rpt: "Remedial Investigation, Insular Territory Hazardous Waste Sites, Draft Report"	113

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38	06/08/83	Antonio B. Won Pat, Member of U.S. Congress	William D. Ruckelshaus, Administrator, EPA	Ltr: Information request Re: Toxic waste disposal in Guam (with attached 6/29/83 ROC Re: Won Pat letter)	2
55	06/08/83	Norman L. Lovelace, EPA Region IX	Herman D. Sablan, Administrator, Guam EPA	Ltr: Transmittal of "Remedial investigation of the Insular Territory hazardous waste sites"	2
53	06/22/83	Margaret Sizemore, Daily News Staff	Newspaper Readers	News: "Ordot dump samples declared non-toxic"	1
54	06/29/83	Margaret Sizemore, Daily News Staff	Newspaper Readers	News: "Waste cleanup hinges on EPA"	1
52	07/21/83	Norman L. Lovelace, EPA Region IX	Herman D. Sablan, Administrator, Guam EPA	Ltr: With attached suggested language for ROD public comment period notification	2
51	09/07/83	James B. Branch, Administrator, Guam EPA	Norman L. Lovelace, EPA Region IX	Ltr: Re: Public comment on Draft Remedial Investigation	1
58	09/30/83	Harry Seraydarian, EPA Region IX	Herman D. Sablan, Administrator, Guam EPA	Notice ltr: Violation of 40 CRF Part 265 - Interim Status Standards for hazardous waste TSD facilities	3
59	10/18/84	James B. Branch, Administrator, Guam EPA	Francis K.Y. Mau, Environmental Branch, Dept. of the Navy	Ltr: Comments on Scope of Work for confirmation of IAS sites on U.S. Navy properties in Guam (Re: 10/2/84 ltr.)	1

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36	03/27/85	James B. Branch, Administrator, Guam EPA	Doris Lee-Betuel, EPA Region IX	Cover ltr. with attached project synopsis for WERI's Ordot Landfill Leachate Study	13
35	05/16/85	Marvin Young, EPA Region IX	Jerry Clifford, EPA Region IX	Memo: Quarterly report - Ordot Landfill, Guam - Jan 1985-Mar 1985	2
22	08/13/85	James L. Canto, Guam EPA	Doris Lee-Betuel, EPA Region IX	Ltr: Transmittal of Guam Water and Energy Research Institute project for investigations surface and groundwater contamination	8
73	09/10/85	James A. Goodrich, CDM	Keith A. Takata and Thomas A. Mix, EPA Region IX	Rpt: "Work Plan Memorandum for Ordot Landfill, Guam"	25
24	11/06/85	James A. Goodrich, CDM	Thomas A. Mix, EPA Region IX	Memo: Ordot Landfill initial site inspection	4
72	11/20/85	CDM	EPA Region IX	Rpt: "Revised Work Plan Memorandum for Ordot Landfill, Guam"	26
64	06/02/86	James A. Goodrich, CDM	EPA Region IX	Rpt: Ordot Landfill, Guam RI, Work Plan Vol. I - "Technical Scope of Work"	61
18	06/25/86	Terry L. Stumph, EPA Region IX	Keith A. Takata, EPA Region IX	Memo: Review of Ordot Landfill sample plan	4
71	07/24/86	CDM	EPA Region IX	Rpt: "Quality Assurance Project Plan, Remedial Investigation, Ordot Landfill Site, Guam"	95

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10	08/13/86	Harry Seraydarian, EPA Region IX	James B. Branch, Guam EPA	Notification of proposed selection of Ordot Landfill as a Superfund site	4
68	08/14/86	Peter Rubenstein, EPA Region IX	Thomas A. Mix, EPA Region IX	Memo: Review of Ordot Landfill sampling and analysis plan dated 7/18/86 (plan found inadequate)	2
17	08/18/86	James B. Branch, Guam EPA	Carl Aguan, Dir. of Public Works, Guam	Notice of violation Re: Uncontrolled scavenging at Ordot Landfill	7
69	08/20/86	Terry L. Stumph, EPA Region IX	Keith A. Takata, EPA Region IX	Memo: Discussion of Ordot Landfill QAPP (7/24/86 revision) review	3
67	09/25/86	James A. Goodrich, CDM	EPA Region IX	Rpt: "Final Quality Assurance Project Plan, Remedial Investigation, Ordot Landfill Site, Guam"	99
70	11/06/86	Terry L. Stumph, EPA Region IX	Keith A. Takata, EPA Region IX	Memo: Discussion of Rose Fong's review of the Quality Assurance Project Plan	3
11	12/01/86	Patricia Connaughton, EPA Region IX	Thomas A. Mix, EPA Region IX	Memo: Evaluation of Ordot sample plans	3
7	12/12/86	Patricia Sanderson Port, U.S. Dept. of Interior	Bruce Blanchard, U.S. Dept. of Interior	Memo: Preliminary natural resources survey report	2
13	01/26/87	Jeff Zelikson, EPA Region IX	CAPT Donald O'Shea, U.S. Navy	Ltr: CERCLA 104 information request Re: U.S. Navy responsibility at Ordot Landfill	3

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63	02/02/87	James A. Goodrich, CDM	EPA Region IX	Rpt: "Final Sampling and Analysis Plan, Phase I Remedial Investigation, Ordot Landfill, Guam"	250
8	02/03/87	Lawrence J. Caplan, Commercial Sanitation Systems, Inc., Tomuning, Guam	Jeff Zelikson, EPA Region IX	Ltr: Re: Involvement with Ordot Landfill	1
12	02/04/87	Peter Rubenstein, EPA Region IX	Stewart Simpson, EPA Region IX	Memo: Transmittal and approval of proposed Ordot Landfill air sampling plan	3
9	02/09/87	Patricia Connaughton, EPA Region IX	Thomas A. Mix, EPA Region IX	Memo: Ordot Landfill sampling and analysis plan review	1
66	02/10/87	Neil E. Botts, CDM	Nancy Lindsay, EPA Region IX	Rpt: "Final Quality Assurance Project Plan, Remedial Investigation, Ordot Landfill Site, Guam"	300
3	05/04/87	James A. Goodrich, Camp, Dresser & McKee (CDM)	Thomas A. Mix, EPA Region IX	Ltr: Revised schedule, Phases I & II Remedial Investigation, Ordot Landfill, Guam	1
5	05/27/87	Kent M. Kitchingman, EPA Region IX	Thomas A. Mix, EPA Region IX	Review of analytical data - samples MY0195, MY2095-2100, MY0789-0791, MY0187 (13 waters)	7
62	06/08/87	James A. Goodrich, CDM	EPA Region IX	Rpt: "Addendum to Final Sampling and Analysis Plan for Second Quarter of Sampling for the Remedial Investigation for Ordot Landfill, Guam"	57

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2	06/16/87	Debra L. Bogen, Lockheed Engineering, Management Services	Kent M. Kitchingman, EPA Region IX	Organic analysis screen with transmittal letter	6
25	11/18/87	CDM	EPA Region IX	Rpt: Final initial site characterization report, Ordot Landfill - Island of Guam	58
61	02/11/88	Kent M. Kitchingman, EPA Region IX	Thomas A. Mix, EPA Region IX	Memo: Review of analytical data, samples Y4953 to Y4962, Y4964, Y4965, Y4795, YB196, YB199 & YB200	14
21	/ /			Briefing document: Description of Ordot Landfill site	1
46	/ /	EPA Region IX		Comprehensive remedial response fact sheet, Insular Territories	7

SUPPLEMENT No. 1

ORDOT LANDFILL SUPERFUND SITE
Ordot, Guam

ADMINISTRATIVE RECORD WITH INDEX
(Indexed by Date)

This Supplement Was Compiled September 22, 1988 and Includes Documents 76-96

SUPPLEMENT No. 1

ORDOT LANDFILL SUPERFUND SITE
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ADMINISTRATIVE RECORD WITH INDEX
(Indexed by Date)

This Administrative Record Index lists the documents contained in the attached Administrative Record Supplement No. 1 to the Administrative Record for the Ordot Landfill Superfund Site in Ordot, Guam. The Index presents the documents in ascending chronological order, which is consistent with the arrangement of the documents in the Supplement itself.

The documents contained in Supplement No. 1 to the Administrative Record were used by the U.S. Environmental Protection Agency in identifying remedial activities appropriate for use at the Ordot Landfill Superfund Site.

Supplement No. 1 to the Administrative Record contains documents identified for inclusion in the Administrative Record following the initial compilation, which was placed near the site on July 11, 1988.

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76	03/26/86	Frank M. Covington, EPA Region IX	Carl J. C. Aguon, Guam Dept. of Public Works	Cover Letter: Transmittal of attached Finding of Violation and Order	9
77	01/01/88	Kathy Diehl, EPA Region IX	Rick Sugarek, EPA Region IX	Memo: Comments on Proposed Remedial Action Plan of 6/22/88 (Document date assigned for indexing; actual date unknown)	1
78	01/01/88	Arnold Den, EPA Region IX	EPA Region IX	Comments on Sampling Performed at Ordot Landfill (Document date assigned for indexing; actual date unknown)	2
79	03/15/88	Rick Sugarek, EPA Region IX	Files	Memo: Response to Comments Regarding Ordot Landfill PRAP and ISC by Regional Senior Scientist	5
80	06/22/88	Rick Sugarek, EPA Region IX	James L. Canto, Guam EPA	Cover Letter: Transmittal of attached Proposed Remedial Action Plan (PRAP)	21
81	06/24/88	James L. Canto, Guam EPA	Faye Vasapolli, Pacific Daily News	Letter: Publication of Federal EPA's Notice on the Ordot Landfill Superfund Site from the California Newspaper Exchange	1
82	06/29/88	James L. Canto, Guam EPA	Rick Sugarek, EPA Region IX	Letter: Comments on 6/22/88 Proposed Remedial Action Plan	3

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83	07/06/88	James L. Canto, Guam EPA	Doris Lee-Betual, EPA Region IX	Memo: Comments on the Endangerment Assessment	1
84	07/06/88	Jane Hoppin, ICF Clement	Rick Sugarek, EPA Region IX	Memo: Preliminary Discussion of Leachate for Inclusion in the Endangerment Assessment for Ordot Landfill	2
85	07/08/85	Norman L. Lovelace, Doris Lee-Betuel, EPA Region IX	Files	Memo: Proposed De-Listing of Ordot Landfill from the NPL	2
86	07/08/88	ICF/Clement	CH2M Hill	Report: Preliminary Endangerment Assessment for the Ordot Landfill, Guam	60
87	07/08/88	Jeff Zelikson, EPA Region IX	David Howekamp, Harry Seraydarian et al	Memo: Transmittal of 6/22/88 Proposed Remedial Action Plan to EPA Managers for Comment	2
88	08/08/88	Gerald F. S. Hiatt, EPA Region IX	Rick Sugarek, EPA Region IX	Memo: Comments on Ordot Risk Assessment	4
89	08/11/88	Norman L. Lovelace, EPA Region IX	Nancy Boone, U.S. Dept. of Interior	Letter: Discussion of Proposed Authorization of $1.7 million for Expansion and improvement at Ordot Landfill	2
90	08/13/88	Rick Sugarek, EPA Region IX	Files	Memo: Response to Comments of Regional Toxicologist re: Ordot Landfill	4

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91	08/17/88	Melvin Okawa, EPA Region IX	Lead Reviewer, OGW	Memo: Review of 6/22/88 Proposed Remedial Action Plan	1
92	08/29/88	Kent Kitchingman, EPA Region IX	Rick Sugarek, EPA Region IX	Memo: Comments on Proposed Remedial Action Plan for Ordot Landfill, Guam	1
93	09/06/88	Harry Seraydarian, EPA Region IX	Jeffrey Zelikson, EPA Region IX	Memo: Comments on Proposed Remedial Action Plan	2
94	09/06/88	Rick Sugarek, EPA Region IX	Kent Kitchingman, EPA Region IX	Memo: Response to Concerns of 8/29/88 memo Commenting on the Proposed Remedial Action Plan	1
95	09/08/88	James L. Canto, Guam EPA	Doris Lee-Betuel, EPA Region IX	Cover Letter: Transmittal of Minutes of 7/26/88 Public Meeting on the Ordot Landfill Remedial Action Plan	5
96	09/20/88	EPA Region IX	EPA and the Public	Responsiveness Summary	1

DECLARATION FOR THE RECORD OF DECISION

Site: Norman Poer Farm Site
Hancock County, Indiana

Statement of Basis and Purpose

This decision document presents the selected remedial action for the Norman Poer Farm Site, in Hancock County, Indiana, developed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986 and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan. This decision is based on the contents of the Administrative Record for this site. The attached index identifies the items that comprise the Administrative Record upon which the selection of the remedial action is based.

The State of Indiana has concurred on the selected remedy.

No Further Action Alternative

This Record of Decision concludes that once monitoring wells have been successfully abandoned, no further action is needed at the site. This conclusion is based on the results of the Remedial Investigation (RI) for the site which show that the previous removal actions were adequate to protect human health and the environment.

Declarations

The "no further action" remedy is protective of human health and the environment, attains Federal and State requirements that are applicable or relevant and appropriate, and is cost-effective. Without significant contamination there is no need to satisfy the statutory preference for remedies that employ treatment which reduces toxicity, mobility, or volume as a principal element and utilizes permanent solutions to the maximum extent practicable. Because this remedy will not result in hazardous substances remaining onsite that are a threat to human health and environment, the 5-year review will not apply to this action.

Valdas V. Adamkus
Regional Administrator

DATE SEP 29 1988